



National Aeronautics and
Space Administration
Goddard Space Flight Center

GODDARD

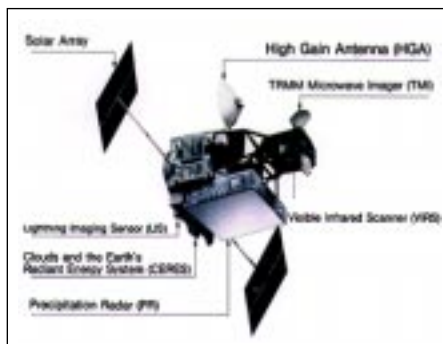
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TRMM Launch scheduled for Nov 18 in Japan - Goddard has big role

As Goddard readies for the launch on Nov. 18, **Tom LaVigna**, TRMM Project Manager, had this reflection: "TRMM has been a very exciting and challenging project, it includes the largest observatory ever done in-house at Goddard. The project was accomplished by a dedicated team of civil servants and support contractors that did an outstanding job".



TRMM Observatory. For details visit the TRMM homepage at <http://trmm.gsfc.nasa.gov>

The Tropical Rainfall Measuring Mission (TRMM) is a joint mission between NASA and the National Space Development Agency (NASDA) of Japan designed to monitor and study tropical rainfall and the associated release of energy that helps to power the global atmospheric circulation shaping both

weather and climate around the globe.

The TRMM Observatory carries five instruments as depicted in above graphic: the first spaceborne Precipitation Radar (PR), the TRMM Microwave Imager (TMI), a Visible and Infrared Scanner (VIRS), a Cloud and Earth Radiant Energy System (CERES), and a Lightning Imaging Sensor (LIS).

Why we need TRMM

Heard of the threat of global warming? Is the threat real? Computer models that predict the future climate still differ in some very substantial ways with some models predicting little or no warming while others predict temperature increases that would substantially alter our way of life. TRMM is a research satellite designed to help our understanding of the water cycle in the current climate system. TRMM's science objectives are as follows: to obtain and study multi-year science data sets of tropical and subtropical rainfall measurements; to understand how interactions between the sea, air and land masses produce changes in global rainfall and climate; to improve modeling of tropical rainfall processes and the influence on global circulation in order to predict rainfall and variability at various time scale intervals; to test, evaluate and improve the performance of satellite rainfall measurement techniques.

Tropical rainfall affects the lives and economics of half the Earth's population-residents of developing countries on or near the Equator. Rainfall variation in the tropics can affect the weather in locations thousands of miles away, impacting the lives and livelihoods of populations worldwide.

Data from TRMM sensors will be processed at Goddard. Data also will be processed at the Earth Observation Center (EOC) in Japan. It will be distributed to scientists in the fields of climatology, metrology, hydrology and other disciplines in Japan and the United States.

Goddard's key individuals for information regarding spacecraft, science, or general issues: **Mr. W. Allen Kenitzer**, Office of Public Affairs; **Dr. Joanne Simpson**, TRMM Project Scientist, Code 900; **Mr. Thomas LaVigna**, TRMM Project Manager, Code 490

Employees may view the TRMM Launch Tuesday, Nov 18 at 3:40 p.m., building 8, auditorium. Come at 3:30 to get your information packet on TRMM.

<http://internal.gsfc.nasa.gov>

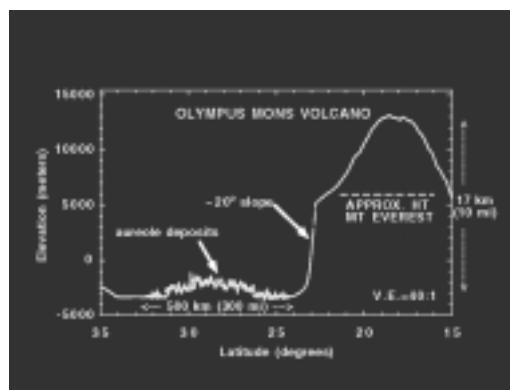
Goddard has a new Internal Homepage for employees only.

Visit it for the latest on news and announcements just for employees. Check out G-Whiz our cool browse feature - also available - a full web search tool

Goddard's Dave Smith presents Fascinating Data from MOLA

NASA's Mars Global Surveyor spacecraft has successfully resumed aerobraking through the upper atmosphere of Mars.

Global Surveyor's orbit into the Martian atmosphere will be lowered more gradually than originally planned, which will lead to a new



Mars' Olympus Mons Volcano-elevation data from MOLA

mapping orbit that preserves all of the original scientific objectives of the mission. Mapping will begin one year later than originally planned. The new mapping orbit will take an additional year to achieve.

During next year's hiatus, Mars Global Surveyor will

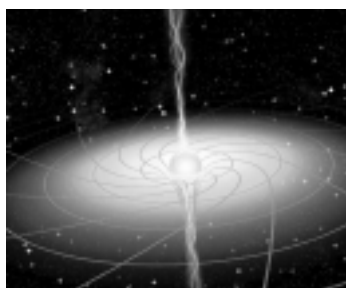
remain in a fixed, elliptical orbit in which it will pass much closer to the surface of Mars during each periapsis — or closest part of its orbit around Mars — than it will in the final mapping orbit.

At a recent briefing held for reporters at the Jet Propulsion Laboratory, Goddard's **Dave Smith**, principal investigator for the Mars Orbiter Laser Altimeter, discussed the results of topographic profiles obtained by the instrument.

Smith drew a comparison to Mount Everest, the highest mountain on Earth, he noted that it is less than half the height of Olympus Mons. For further details visit the MOLA homepage at url <http://ltpwww.gsfc.nasa.gov/tharsis/mola.html>

FRAME DRAGGING

by Bill Steigerwald, Office of Public Affairs



"Frame Dragging" NASA's Rossi X-ray Timing Explorer (RXTE) spacecraft

Astronomers using NASA's Rossi X-ray Timing Explorer (RXTE) spacecraft reported today that they have observed a black hole that is literally dragging space and time around itself as it rotates. This bizarre effect, called "frame dragging," is the first evidence to support a prediction made in 1918 using Einstein's theory of relativity. The research team, led by Dr. Wei Cui of the Massachusetts

Institute of Technology, announced their results during the American Astronomical Society's High Energy Astrophysics Division (HEAD) meeting in Estes Park, CO. Collaborators in the research include **Dr. Wan Chen** of Goddard and Dr. Shuang N. Zhang of Marshall Space Flight Center. For further details go to url <ftp://pao.gsfc.nasa.gov/pub/pao/releases/1997/97-148.htm>

Current news

- Health Benefits Fair, Wednesday, Nov. 19, 11:00-2:00pm, building 8, auditorium
- Goddard is at \$222,050 for CFC contributions. This is 51% of its goal of \$435,000.
- Nov. 19 - 3:00-4:30 p.m. Director's Colloquium, in building 3 auditorium. Dr. Phil Smith speaks on a new model for funding science and technology.
- Space Research Shines a Light on Tumors to Save Lives - for details go to <ftp://ftp.hq.nasa.gov/pub/pao/pressrel/1997/97-259.txt>

Are you working with our international partners and/or traveling overseas on official government business?

by Sheryl Goddard, Code 200

If you answered yes, it's important you read on.

NASA has an agency-wide requirements contract with Schreiber Translations, Inc. (STI) to provide translation, interpretation, visa processing and overseas logistical support.

Technical and non-technical interpretation and translation is available in all languages. Interpreters are required to have backgrounds in engineering, aeronautical science, space science, earth science, microgravity, or life sciences so they are thoroughly knowledgeable in scientific terms. All interpreters and translators are certified or accredited by a recognized certifying organization. Documents can be electronically transmitted to the requester and copies of the translated documents are forwarded to CASI. Slides can also be prepared in Russian or Japanese.

Visa processing and coordination is provided for government and contractor employees and includes instruction in application preparation, visa application coordination, resolution of problems incurred when visas have been previously obtained, pick up and delivery of visas.

Overseas logistical support is provided in the form of administrative, clerical and in-country transportation services to NASA personnel conducting official business in certain countries where it is expected that logistical and transportation services are not readily available or reliable. This is primarily intended for the Newly Independent States of the former Soviet Union and China. Administrative and clerical support includes advanced preparation and support of official meetings and high-level visits, including special official tours, trip logistics, taking notes, answering telephones, documentation, reports and copying.

If you receive a requirement for these services, the services must be ordered under this contract. Schreiber is entitled to damages if the Government breaches this obligation by acquiring these services elsewhere.

Should you have any questions, please contact the Contracting Officer (**Ms. Carol Bleile**, 301-286-0792) or the Contracting Officer's Technical Representative (Ms. Shirley Perez, 202-358-1619).

PROJECT <http://www.gsfc.nasa.gov>

Additional Appointments to AETD Management Team...

- **Gretchen Burton**- Associate Chief of the Business Management Office (Code 501)
 - **Cathy Long** - Head of the Microwave Instrument Technology Branch (Code 555) in the Instrument Technology Center
 - **Wes Ousley** - Associate Head of the Thermal Engineering Branch (Code 545) in the Mechanical Systems Center
 - **Howard Herzig** - Associate Head of the Optics Branch (Code 551) in the Instrument Technology Center
 - Electrical Systems Center: **Tim Sauerwein**-Assoc. Head of The Microelectronics and Signal Processing Branch (Code 564), **Mark Jarosz** and **Dean Price** - Assoc. Heads of the Electrical Systems Branch (Code 565); ***Ken Perko** and **Alan Selser**- Assoc. Heads of the Microwave Systems Branch (Code 567)
 - Guidance, Navigation and Control Center: **Joel Simpson**-Assoc. Head of GN&C Systems Engineering Branch (Code 571); **Jim Jackson**-Assoc. Head of Flight Dynamics Analysis Branch (Code 572); **Chuck Claggett**-Assoc. Head Component and Hardware Systems Branch (Code 573)
 - Information Systems Center: **Ray Whitley**-Assoc. Head Flight Software Branch (Code 582); ***Jay Pittman**-Assoc. Head of the Real-Time Software Engineering Branch (Code 584)
- *Resident at Wallops

GODDARD <http://www.gsfc.nasa.gov>

Lossless Data Compression

by William B. Poland, Jr. Code 730.4

The Consultative Committee for Space Data Systems (CCSDS) has just released an international Recommendation (effectively a standard) for lossless data compression.

Basically, this lossless compression technique consists of two parts, a Preprocessor and an Adaptive Entropy encoder. The Preprocessor performs two basic functions: prediction and mapping. Prediction is performed by taking input data blocks and successively subtracting the value of the "n-th" input data block from the value of the previous data block. The resultant "prediction error" is passed to the mapping function, where it is mapped into an n-bit integer value based on the predictor value.

The preprocessed samples are then delivered to the Adaptive Entropy Encoder, where some 12 parallel encoding options are available. When operating on the series of preprocessed samples, each with varying entropy, different encoding options will successively produce the greatest compression ratio. In each given instance, the option used is given an identification (ID) number that is attached to the code block being delivered to the data user.

When the code blocks are received at the user's site, the decoder/decompressor can use the ID to reverse the coding process, restore the removed redundancy, and reconstruct the original data without introducing any distortion.

This new international standard will provide benefits in the transmitting and storing of science data as well as in many other applications, such as medical imaging, where it is already being considered. The technique embodied in this standard yields the following characteristics:

- it is easily applied to packetized systems without a priori information;
- it establishes the data statistics for each packet;
- it is therefore adaptive to changes in data statistics in real time;
- it operates in real time with few processing steps and a small memory requirement.

This CCSDS standard and its accompanying report, together with all other CCSDS standards, are available on the Web at the following URL: http://www.ccsds.org/ccsds/ccsds_document_access.html.

Alternatively, hard copies or a CD may be obtained by calling 6-8592. The document numbers are, respectively, CCSDS 121.0-B-1 (listed under CCSDS Recommendations) and CCSDS 120.0-G-1 (listed under CCSDS Reports).

This document is largely the work of two Code 700 employees, **Dr. Pen Shu Yeh** and **Mr. Warner Miller**. The Exceptional Engineering Achievement Medal was awarded to Dr. Yeh in part because of her theoretical analysis performed in this area.

Access the MODIS Document Archive (MODARCH)

by Bob Kannenberg, MAST Technical Writer, Code 922

The Moderate Resolution Imaging Spectroradiometer (MODIS) Document Archive (MODARCH) is an electronic imaging system that allows documents to be archived and retrieved electronically. MODARCH provides MODIS team members worldwide with access to MODIS-related information from their desktop computers (Mac, PC or UNIX).

The archive includes, but is not limited to, the MODIS Specifications; minutes from Science, Technical and Support Team meetings; contract deliverables and technical memoranda; Science Team members' quarterly and semi-annual reports; journal articles; and other reports, plans and presentations (such as ATBDs).

To access MODARCH, point your Web browser to:

<http://modarch.gsfc.nasa.gov/MODARCH/modarch.html>

Direct questions and comments to Kevin Ward, MODARCH System Administrator: kevin.ward@gsfc.nasa.gov

GODDARD staff

Executive Editor: Darlene Ahalt
Managing Editor: Deanna Adams
Senior Photographer: Mark DeBord
Submission deadline is Thursday each week.
(submissions subject to editing)
For additional information contact:
Deanna Adams 301•286•0918.

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Contact:
Gweny Durrah, Code 239
Darlene Ahalt, Code 130
Bob Wilson 301•422•8334